NATURAL RESOURCES CONSERVATION SERVICE

VIRGINIA CONSERVATION PRACTICE STANDARD

MANURE TRANSFER

(No.)

Code 634

DEFINITION

A manure conveyance system using structures, conduits, or equipment.

PURPOSE

To transfer animal manure (bedding material, spilled feed, process and wash water, and other residues associated with animal production may be included) through a hopper or reception pit, a pump (if applicable), and a conduit to:

- a manure storage/treatment facility,
- a loading area, and/or
- to agricultural land for final utilization. This includes application of manure to the utilization area.

CONDITIONS WHERE PRACTICE APPLIES

The manure transfer component is a part of a planned agricultural manure management system.

This practice applies where manure is generated by livestock production or processing; and a conveyance system is necessary to transfer manure from the source to a storage/treatment facility and/or a loading area, and/or from storage/treatment to an area for utilization.

CRITERIA

CRITERIA FOR ALL PURPOSES

Manure transfer components shall comply with all federal, state, and local laws, rules, and regulations.

Structures

All structures, including those which provide a work area around pumps, will be designed to withstand the anticipated static and dynamic loading. The structure shall withstand earth and hydrostatic loading in accordance with Virginia Conservation Practice Standard *Waste Storage Facility (Code 313)*. The minimum thickness of component elements of concrete structures shall also be in accordance with this practice standard. When needed, covers shall be designed to support the anticipated dead and live loads.

Reception pits shall be sized to contain one full day of manure production.

Openings to structures to receive manure from alley scrape collection shall be a minimum of 9 square feet with one dimension no smaller than 4 feet. The opening shall be equipped with a grate designed to support the anticipated loads.

When curbs are needed in conjunction with structures, they shall be constructed of either concrete or wood. Curbs shall be of sufficient height to ensure total manure flow into the structure and will be adequately anchored.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Pipelines

Design of pipelines shall be in accordance with Virginia Conservation Practice Standard *Irrigation Pipeline (Code 430)*. The minimum pipeline capacity from collection facilities to storage/treatment facilities shall be the maximum flow anticipated on a daily basis. The minimum pipeline capacity from storage/treatment facilities to utilization areas shall ensure the storage/treatment facilities can be emptied within the time limits stated in the management plan for manure utilization. Pipelines shall be designed to have a minimum of 2 feet per second and a maximum of 6 feet per second velocity except where ruminant manure is transferred in a gravity system; in which case, velocities can be reduced if a minimum of 5 feet of head is provided on the pipe system.

Clean-out access shall be provided for gravity pipelines at a maximum interval of 200 feet for lines carrying non-bedded manure. For pipelines carrying bedded manure, the maximum interval shall be 150 feet. Gravity pipelines shall not have horizontal curves or bends, except minor deflections (less than 10 degrees) in the pipe joints, unless special design considerations are used.

Other Conduits

Concrete lined ditches and ramps shall be designed in accordance with sound engineering practices. A minimum design velocity of 1.5 feet per second shall be used.

Pumps

Pumps installed for manure transfer shall meet the requirements of Virginia Conservation Practice Standard *Pumping Plant (Code 533)*. Pumps shall be sized to transfer manure at required system head and volume. The type of pump shall be based on the consistency of the manure. Consideration for pump installations shall be based on manufacturer's recommendations.

Safety

The system design shall consider the safety of humans and animals during construction and operation.

Open structures shall be provided with covers or barriers such as gates, fences, etc. Ventilation and warning signs shall be provided for manure transfer systems as necessary to warn of the danger of entry and to reduce the risk of explosion, poisoning, or asphyxiation.

Pipelines from enclosed buildings shall be provided with a water-sealed trap and vent or similar devices where necessary to control gas entry into buildings.

Gravity discharge pipes used for emptying a storage/treatment facility shall have a minimum of two gates or valves, one of which shall be manually operated.

CRITERIA FOR LAND APPLICATION

Manure shall be applied to the utilization area in amounts and at a time consistent with the certified nutrient management plan and Virginia Conservation Practice Standard *Waste Utilization (Code 633)*.

Sprinklers or sprinkler systems shall be designed in accordance with Virginia Conservation Practice Standard *Irrigation System, Sprinkler (Code 442)*. Sprinkler system design capacity shall be adequate to apply the required volume of manure at a rate and uniformity that shall prevent runoff and meet the nutrient needs of the plants. Nozzle size shall be appropriate for the consistency of the manure applied. Sprinkler-applied, manure-contaminated water shall normally contain less than two percent solids unless provisions are made for straining or filtering before application.

All sprinkler systems shall have backflow prevention devices.

Manure spreaders and/or tank wagons shall have adequate capacity to ensure the emptying of storage/treatment facilities within appropriate time periods as stated in the system operation and maintenance plan.

Gated pipe and other appurtenances used in conjunction with gravity application shall be designed to ensure uniform application amounts.

CONSIDERATIONS

- Utilization of topography to generate head to reduce pumping requirements
- Economics (including design life), overall waste management system plans, and health and safety factors
- Possible contamination of domestic water systems and groundwater
- Loading and unloading of equipment in the vicinity of the manure transfer components
- Subsurface conditions, i.e., depth to bedrock, water table, etc.
- When applicable, compatibility to joint use of manure transfer with irrigation system design requirements
- System for flushing pipelines with clean water
- Provisions for cleaning out solids deposition in ditches
- Pipe pressure rating adjustments required based on manure temperature
- Corrosion resistance and water tightness in the selection of pipe material and joints
- Need for appropriate check values, anti-siphon protection and open air breaks
- Sanitation needs of all conveyance equipment that enters/exists the farm in order to prevent the spread of disease
- Tractors or other vehicles used to tow manure spreaders or tank wagons should be sized to reduce the danger of rollover.

PLANS AND SPECIFICATIONS

Plans and specifications for installing manure transfer systems shall be in accordance with the overall waste management system plan and the operation and maintenance plan required by the applicable Virginia Conservation Practice Standards *Waste Storage Facility (Code 313)* or *Waste Treatment Lagoon (Code 359)*.

DESIGN DATA

1. Detailed soils, foundation, and site investigation report with supporting data
2. Field survey
3. Plan view of system layout
4. Soil and foundation findings, interpretations, and reports
5. Waste storage volume calculations for a storage period in agreement with a current Nutrient Management Plan
6. Complete design computations and drawings to describe the horizontal and vertical position of structures and their relation to adjacent physical features. The distance to the nearest area or public use or residence of anyone other than the owner or his tenant shall be recorded. Include required sealing treatments or liners.
7. Material quantities
8. Structural details of all components
9. References and certifications of components supplied by others (pumps, commercial liner specifications, truss manufacturer certification, etc.)
10. Drainage/grading plan if needed
11. Special safety requirements
12. Temporary erosion control measures during construction
13. Operation and Maintenance requirements
14. A completed Waste Management System Plan for the owner's total livestock operation that addresses types and numbers of animals
15. Environmental Evaluation Form VA-EE-1

CHECK DATA

1. As-built drawings showing changes from the design
2. As-built storage volume
3. Component certifications; i.e., manufacturer's design, holding pond liner, existing components of new waste system, etc.
4. NRCS or PE storage facility certification
5. Statement that disturbed areas have been stabilized and fencing is adequate

OPERATION AND MAINTENANCE

Operation and maintenance shall be in accordance with the requirements specified in the overall operation and maintenance plan required by the applicable Virginia Conservation Practice Standard *Waste Storage Facility (Code 313)* or *Waste Treatment Lagoon (Code 359)*.

EMERGENCY ACTION PLAN

The emergency action plan shall be in accordance with the requirements specified in the overall operation and maintenance plan required by the applicable Virginia Conservation Practice Standards *Waste Storage Facility (313)* or *Waste Treatment Lagoon (Code 359)*.

REFERENCES

1. ACI 318, 360, 530.
2. ASTM D653, D698, D2488, D1760.
3. ASAE Specifications: EP378.3, EP393.2, EP288.5, S288.
4. Agricultural Waste Management Field Handbook, Chapters 7 and 10, NEH Part 651
5. Basic Building Code, 12th Edition, 1993, Building Officials and Code Administrators, Inc. (BOCA).
6. "Manual of Steel Construction", American Institute of Steel Construction.
7. "National Design Specifications for Wood Construction", American Forest and Paper Association.
8. National Engineering Manual, Part 520.
9. NRCS, Virginia Field Office Technical Guide, Section IV.
10. NRCS, Technical Release, TR-74.
11. NRCS, Field Book for Describing and Sampling Soils.

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Approved Practice Narratives

(No.)

CODE 634

634 D1 Manure Transfer: A reception pit, pump, and conduit for manure transfer will be installed at the approximate location shown on the Conservation Plan map, and maintained as a component of the Waste Management System. The design, construction specifications, and operation and maintenance guidelines will be provided.

634 D2 Manure Transfer: A reception pit and conduit for manure transfer will be installed at the approximate location shown on the Conservation Plan map, and maintained as a component of the Waste Management System. The design, construction specifications, and operation and maintenance guidelines will be provided.

634 D3 Manure Transfer: A system for manure transfer will be installed at the approximate location shown on the Conservation Plan map, and maintained as a component of the Waste Management System. The design, construction specifications, and operation and maintenance guidelines will be provided.

634 D4 Manure Transfer: An irrigation system to transfer manure will be installed at the approximate location shown on the Conservation Plan map, and maintained as a component of the Waste Management System. The design, construction specifications, and operation and maintenance guidelines will be provided.

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